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NESTING SUCCESS AND PRODUCTIVITY OF KEY RAPTOR SPECIES

AND PRELIMINARY HERPTILE SURVEY,

KEVIN RIM RAPTOR STUDY AREA, TOOLE COUNTY, MONTANA, 2004

Challenge Cost Share Progress Report to:

Bureau of Land Management



Great Falls District

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## ABSTRACT

Nesting success and productivity of Ferruginous Hawks (*Buteo borealis*), Prairie Falcons (*Falco mexicanus*), and Golden Eagles (*Aquila chrysaetos*) in the Keweenaw Raptor Study Area (KRSSA) of northern Toole County, Montana were determined between 30 June and 2 July 2004. On 30 June a general area reconnaissance for reptiles and amphibians was conducted, while searches were conducted on 16-17 August 2004. Ten Ferruginous Hawk breeding areas produced  $\geq 30$  young, 10 Prairie Falcon breeding areas produced  $\geq 20$  young, and 2 Golden Eagle breeding areas produced 1 young. Number of successful Ferruginous Hawk nests in the Primary Study Area (PSA) declined from 1988 to 2004 ( $P = 0.019$ ). No Ferruginous Hawk nestlings were banded in 2004 due to advanced age of nestlings. Two Red-tailed Hawk (*Buteo lineatus*) produced  $\geq 1$  and 3 young. Three Swainson's Hawks (*Buteo swainsoni*) were incubating during surveys. No systematic surveys for white-tailed ptarmigan (*Lagopus lagopus*) and Richardson's ground squirrels (*Spermophilus richardsoni*) were conducted.

Al Harmata, Marco Restani<sup>1</sup>, and Dennis Flath<sup>2</sup>

Department of Ecology

Fish & Wildlife Program

Montana State University

Bozeman 59717

21 October 2004

<sup>1</sup>Current address, Dept. of Biological Sciences, St. Cloud State University, St. Cloud, MN 56301-4498

<sup>2</sup>Current address, APEX Environmental, 365 W. River Rock Road, Belgrade, MT 59714

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Denver, Colorado 80225

Dr. Harold, Anne Foster, and Carrie Felt

Department of Biology

Box 5 Wildlife Program

Montana State University

Bozeman MT 59717

21 October 2004

Current address: Dept. of Zoology, Box 500, 200 N. 2nd St., Bozeman, MT 59714

4422

Current address: ALEX Environmental, 100 W. Pine Road, Bozeman, MT 59714

Dr. Foster  
Box 50  
Wildlife Program  
Box 500  
Bozeman, MT 59717



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## ABSTRACT

Nesting success and productivity of Ferruginous Hawks (*Buteo regalis*), Prairie Falcons (*Falco mexicanus*), and Golden Eagles (*Aquila chrysaetos*) in the Kevin Rim Raptor Study Area (KRRSA) of northern Toole County, Montana were determined between 30 June and 2 July 2004. On 30 June a general area reconnaissance for reptiles and amphibians was conducted, while searches were conducted on 16-17 August 2004. Ten Ferruginous Hawk breeding areas produced  $\geq 30$  young; 10 Prairie Falcon breeding areas produced  $\geq 20$  young, and 2 Golden Eagle breeding areas produced 3 young. Number of successful Ferruginous Hawk nests in the Primary Study Area (PSA) declined from 1988 to 2004 ( $P = 0.019$ ). No Ferruginous Hawk nestlings were banded in 2004 due to advanced age of nestlings. Two Red-tailed Hawk (*Buteo jamaicensis*) produced  $\geq 1$  and 3 young. Three Swainson's Hawks (*Buteo swainsonii*) were incubating during surveys. No systematic surveys for white-tailed jackrabbits (*Lepus townsendii*) and Richardson's ground squirrels (*Spermophilus richardsonii*) were conducted. Only two species of herptofauna were encountered, the Plains spadefoot toad (*Spea bombifrons*) and the Western rattlesnake (*Crotalus viridis*). A more comprehensive view of the reptile and amphibian community will be attained by conducting surveys monthly, from May through August in the future. Oil production in KRRSA may have negatively impacted the reptile and amphibian community, reducing density of some species and compromising species diversity. A comprehensive and detailed research plan incorporating an appropriate control area is recommended to determine the magnitude of this impact. Any attempt to promote Kevin Rim public lands as a destination for any type of spring-summer recreational activity should be discouraged.

## ABSTRACT

nesting success and productivity of Ferruginous Hawks (*Buteo swainsoni*), Prairie Falcons (*Pescepredator*), and Golden Eagles (*Aquila*) in the Keweenaw National Historic Site (KNHSA) of northern Teton County, Montana were determined between 2000 and 2004. On 20 June a general area reconnaissance for raptors and amphibians was conducted, while searches were conducted on 10-17 August 2004. Ten Ferruginous Hawk breeding areas produced 230 young; 10 Prairie Falcon breeding areas produced 220 young and 2 Golden Eagle breeding areas produced 3 young. Number of successful Ferruginous Hawk nests in the Primary Study Area (PSA) declined from 1988 to 2004 ( $p = 0.01$ ). No Ferruginous Hawk nesting was found in 2004 due to advanced age of nestlings. Two Red-tailed Hawks (*Buteo borealis*) produced 2 and 3 young. Three Swainson's Hawks (*Buteo swainsoni*) were incubating during surveys. No systematic surveys for white-throated sparrows (*Spizella monticola*) and Townsend's ground squirrels (*Spermophilus richardsoni*) were conducted. Only one species of herpetofauna was encountered, the Plains spotted frog (*Rana sierrae*) and the Western toad (*Anaxyrus*). A more comprehensive view of the reptile and amphibian community will be gained by conducting surveys monthly from May through August in the future. On production in KNHSA may have negatively impacted the reptile and amphibian community, reducing density of some species and compromising species diversity. A comprehensive and detailed research plan incorporating an appropriate control area is recommended to determine the magnitude of this impact. Any attempt to promote Keweenaw National Historic Site as a destination for any type of spring-summer recreational activity should be discouraged.



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## INTRODUCTION

The Kevin Rim escarpment in northern Toole County, Montana, provides nesting habitat for a variety of raptors (Dubois 1988). The Bureau of Land Management (BLM) designated the Kevin Rim a "Key Raptor Area" and an "Area of Critical Environmental Concern" (Williams and Campbell 1988) to provide added habitat protection for raptors, especially sensitive and declining species. Ferruginous Hawks (*Buteo regalis*), Prairie Falcons (*Falco mexicanus*), and Golden Eagles (*Aquila chrysaetos*) are designated "Species of Special Concern" in Montana (Flath 1991) and are considered *key* species for investigation of aspects of population dynamics in KRRSA. Montana Natural Heritage Program (1999) also lists the Ferruginous Hawk as a Species of Special Concern and the U.S. Fish & Wildlife Service (USFWS) now considers it and the Prairie Falcon species of Conservation Concern (USFWS 2003).

Initial monitoring and nestling raptor banding efforts in the vicinity of the Kevin Rim escarpment began in 1988. Since then, several intensive studies have focused aspects of raptor ecology (Dubois 1988, Harmata 1991, VanHorn 1993, Zelenak 1996, Harmata and Zelenak 1996, Zelenak et al. 1997). Number of successful Ferruginous Hawk nests in KRRSA declined between 1988 and 2003 (Harmata and Jaffe 2003). Banding in portions of KRRSA was suspended in 1999 and number of annual surveys reduced in 2000 due to suspected negative impacts on Ferruginous Hawk productivity. Coincidentally, more effort was directed at banding in Ferruginous Hawk nests where banding had not previously occurred. Colorbanding Prairie Falcon and Ferruginous Hawk nestlings began in 1995. However, due to the lack of subsequent observations of colorbands, colorbanding was suspended in 2000.

## INTRODUCTION

The Keweenaw Peninsula in northern Teton County, Montana, provides nesting habitat for a variety of raptors (Dube 1988). The Bureau of Land Management (BLM) designated the Keweenaw as a "Key Raptor Area" and an "Area of Critical Environmental Concern" (Williams and Campbell 1988) to provide added habitat protection for raptors, especially sensitive and declining species. Ferruginous Hawks (*Buteo borealis*), Prairie Falcons (*Falco mexicanus*), and Golden Eagles (*Haliaeetus leucos*) are designated "Species of Special Concern" in Montana (Felt 1991) and are considered key species for investigation of aspects of population dynamics in KRPRA. Montana Natural Heritage Program (1993) also lists the Ferruginous Hawk as a Species of Special Concern and the U.S. Fish & Wildlife Service (USFWS) now considers it and the Prairie Falcon species of Conservation Concern (USFWS 2001).

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Reptiles and amphibians are sensitive to habitat conditions and changes, as well as changes in wildlife community composition and abundance. Furthermore, they constitute a significant portion of environmental biomass and are critical components of the food web (Maxell 2000, Koch and Peterson 1995). In particular, reptiles often are prey for a wide variety of omnivores and carnivores (Zug 1993), including ferruginous hawks which is the focal species for studies in the Kevin Rim area.

Some amphibian populations in Montana have recently, or are currently, undergoing declines and extirpations (Reichel and Flath 1995, Carey 1993, Corn and Fogelman 1984). Direct and indirect impacts from a variety of human activities may affect the viability of reptile and amphibian populations in Montana (Joslin and Youmans 1999).

Occurrence of 11 species (5 amphibian, 6 reptile) have been recorded in Toole County, but an additional species of each reptile and amphibian may occur, but have not yet been documented (Maxell et al. 2003). Several species records occur in the extreme southeastern portion of the county, on or near Tiber Reservoir (Rauscher 2000). Only 3 species have been previously recorded in the Kevin Rim area (Maxell et al. 2003).

The Northern leopard frog (*Rana pipiens*) is the only species of special concern suspected to occur in Toole County. This species has undergone significant declines throughout much of its North American range in recent years. Formerly abundant, it is now extinct or nearly so in western Montana (Reichel and Flath 1995). Status and trend are unknown in Toole County.

## 2004 Objectives

### A. Raptors:

Reptiles and amphibians are sensitive to habitat conditions and changes, as well as changes in wildlife community composition and abundance. Furthermore, they constitute a significant portion of environmental biota and are critical components of the food web (Maxell 2000, Kohn and Peterson 1992). In particular, reptiles often are prey for a wide variety of omnivores and carnivores (Zug 1993), including raptorial birds which is the focal species for studies in the Keweenaw area.

Some amphibian populations in Montana have recently, or are currently, undergoing declines and extirpations (Reichert and Flath 1992, Carey 1993, Corn and Fogelman 1994). Direct and indirect impacts from a variety of human activities may affect the viability of reptile and amphibian populations in Montana (Joffe and Youngs 1992).

Occurrences of 11 species (2 amphibian, 9 reptile) have been recorded in Teton County, but an additional species of each reptile and amphibian may occur, but have not yet been documented (Maxell et al. 2003). Several species records occur in the extreme southeastern portion of the county, on or near Timberline (Rauscher 2000). Only 3 species have been previously recorded in the Keweenaw area (Maxell et al. 2003).

The western leopard frog (*Rana sierrae*) is the only species of special concern suspected to occur in Teton County. This species has undergone significant declines throughout much of its North American range in recent years. Formerly abundant, it is now extinct or nearly so in western Montana (Reichert and Flath 1992). Status and trend are unknown in Teton County.

2004 Objectives

A. Reptiles



1. Determine location, success<sup>3</sup>, and productivity<sup>4</sup> of Ferruginous Hawks, Prairie Falcons, and Golden Eagles nesting in KRRSA.

B. Herptiles:

1. Determine relative abundance and distributional status of reptile and amphibian species, focusing on species of special concern.
2. Record use of habitat features by reptile and amphibian species.
3. Identify key, or critical habitat components.
4. Identify potential habitat improvement and maintenance opportunities.
5. Provide recommendations for further surveys and research.

## STUDY AREA

KRRSA is located approximately 32½ km north to northwest of the town of Shelby, Toole County, Montana (Fig. 1). The northeast corner of KRRSA includes the town of Sunburst, Montana. KRRSA includes a Primary Study Area (PSA) that has been surveyed annually since 1988, Rattlesnake Coulee, and immediately adjacent table lands (Flats) to the north, east, and south of PSA (Fig. 1). Prior to 1997, coverage of the Flats was cursory but increased in 1997 through 2004. In 1999, the Flats was divided into NE and SE sections (Fig. 1). Rattlesnake Coulee has been surveyed intermittently between 1988 and 1999, but completely since 1999. Buckley Coulee (north of Rattlesnake Coulee outside of KRRSA) was last surveyed in 2000.

## METHODS

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<sup>3</sup>Successful pairs (or nests) are those that fledged young.

<sup>4</sup>Productivity is number of young fledged from successful nests.

1. Determine location, success, and productivity of Ferruginous Hawks, Prairie Falcons, and Golden Eagles nesting in KRRSA.

## B. Herpetiles

1. Determine relative abundance and distribution status of reptile and amphibian species, focusing on species of special concern.
2. Record use of habitat features by reptile and amphibian species.
3. Identify key or critical habitat components.
4. Identify potential habitat improvement and maintenance opportunities.
5. Provide recommendations for further surveys and research.

## STUDY AREA

KRRSA is located approximately 32 km north to northwest of the town of Shelby, Teton County, Montana (Fig. 1). The northeast corner of KRRSA includes the town of Sturtevant, Montana. KRRSA includes a Primary Study Area (PSA) that has been surveyed intensively since 1985. Rathenauke Coulee, and immediately adjacent lands (Fig. 1) to the north, east, and south of PSA (Fig. 1). Prior to 1985, coverage of the flats was cursory but increased in 1985 through 2004. In 1985, the flats was divided into NE and SE sections (Fig. 1). Rathenauke Coulee has been surveyed intensively between 1985 and 1988, but completely since 1993. Buddy Coulee (north of Rathenauke Coulee outside of KRRSA) was last surveyed in 2000.

## METHODS

Success is defined as the number of young fledged from successful nests. Productivity is defined as the number of young fledged from successful nests.



### *Raptors*

One survey for raptor success and productivity was conducted in 2004. To minimize effects of observer activity on raptor nest success, neither occupancy nor activity surveys (normally conducted in April) were conducted in 2004, nor did observers approach Ferruginous Hawk nests closer than 1 km to determine presence of nestlings, unless contained in the sample to be banded. Golden eagle and prairie falcon nestlings of advanced age ( $>2/3$  growth) were considered to have fledged, *i.e.*, nests successful. All Ferruginous Hawk nests containing nestlings, regardless of age were considered successful. Surveys of success and productivity were conducted between 30 June and 2 July 2004. All previously identified nest sites were checked and historical breeding areas searched for new nests. Information gathered included location and number of young of advanced age in successful nests, and plumage of adults and progeny of Ferruginous Hawks.

One survey for raptor success and productivity was conducted in 2004. To minimize effects of observer activity on raptor nest success, neither occupancy nor activity surveys (normally conducted in April) were conducted in 2004, nor did observers approach Ferruginous Hawk nests closer than 1 km to determine presence of nestlings. Nests contained in the sample to be banded. Golden eagle and prairie falcon nestlings of advanced age (>25% grown) were considered to have fledged, i.e., nests successful. All Ferruginous Hawk nests containing nestlings, regardless of age were considered successful. Surveys of success and productivity were conducted between 20 June and 2 July 2004. All previously identified nest sites were checked and historical breeding areas searched for new nests. Information gathered included location and number of young of advanced age in successful nests, and plumage of adults and progeny of Ferruginous









The KRSA was visited June 30-July 2, and again August 16-17, 2004. On June 30 a general area reconnaissance was conducted, while reptile and amphibian searches were conducted on the other dates.

Search techniques included driving searches, timed walking searches of shorelines, upland habitats, and topographic features suspected of harboring reptiles and amphibians (Hendricks 1999), and listening for amphibian calling at a suspected breeding site. Locations of specimens encountered were recorded using a handheld GPS unit. Habitat use, breeding activity, life history stage, and number encountered were recorded as appropriate.

## RESULTS

### 2004 Raptor Nest Success and Productivity

Figure 1. Kevin Rim Raptor Study Area, northern Tool  
County, Montana.

Long-term productivity trend of Ferruginous Hawks was evaluated by regressing number of successful nests in PSA over the 16 years. Data for analysis were compiled from (Dubois 1988), Harmata (1991), VanHorn (1993), Zelenak (1996), Harmata and Zelenak (1996), Zelenak et al. (1997), Harmata et al. (1998, 1999), Harmata and Gable (2000), and Harmata and Jaffe (2001, 2003).

### Herptiles

Table 1. Reproductive performance of Ferruginous  
Hawks in the Kevin Rim Raptor Study Area (KRSA),  
2004

	Successful	Young Produced <sup>1</sup>
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Figure 1. Kevin Rim Radar Study Area, northern Tool  
County, Montana

Long-term productivity trend of Ferruginous Hawks was evaluated by regressing  
number of successful nests in PSA over the 16 years. Data for analysis were compiled  
from (Cupole 1988), Hamata (1991), VanHorn (1993), Zelenak (1996), Hamata and  
Zelenak (1996), Zelenak et al. (1997), Hamata et al. (1998, 1999), Hamata and Gable  
(2000), and Hamata and Jelle (2001, 2003)



The KRRSA was visited June 30-July 2, and again August 16-17, 2004. On June 30 a general area reconnaissance was conducted, while reptile and amphibian searches were conducted on the other dates.

Search techniques included driving searches, timed walking searches of shorelines, upland habitats, and topographic features suspected of harboring reptiles and amphibians (Hendricks 1999), and listening for amphibian calling at a suspected breeding site. Locations of specimens encountered were recorded using a handheld GPS unit. Habitat use, breeding activity, life history stage, and number encountered were recorded as appropriate.

## RESULTS

### *2004 Raptor Nest Success and Productivity*

**Ferruginous Hawks.**-Ten Ferruginous Hawk pairs were successful in KRRSA in 2004 producing a minimum of 30 young (Table 1, Fig. 2). Actual number of young produced in PSA and Rattlesnake Coulee was probably higher than recorded because some nestlings most likely were missed due to observation distance chosen to minimize observer disturbance. Production in the Flats was actual because nests were closely inspected to band nestlings. No Ferruginous Hawk nestlings were banded in 2004.

Table 1. Reproductive performance of Ferruginous Hawks in the Kevin Rim Raptor Study Area (KRRSA), 2004.

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Successf	Young Produced <sup>1</sup>
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The KRRSA was visited June 30-July 2, and again August 16-17, 2004. On June 30 a general area reconnaissance was conducted, while reptile and amphibian searches were conducted on the other dates.

Search techniques included diving searches, timed walking searches of shorelines, upland habitats, and topographic features suspected of harboring reptiles and amphibians (Hendrick 1992), and listening for amphibian calling at a suspected breeding site. Locations of specimens encountered were recorded using a handheld GPS unit. Habitat use, breeding activity, life history stage, and number encountered were recorded as appropriate.

## RESULTS

### 2004 Raptor Nest Success and Productivity

Ferruginous Hawk-Tan Ferruginous Hawk pairs were successful in KRRSA in 2004 producing a minimum of 30 young (Table 1, Fig. 2). Actual number of young produced in PSA and KRRSA was probably higher than recorded because some nestings most likely were missed due to observation distance chosen to minimize observer disturbance. Production in the PSA was actual because nests were closely inspected to band nestlings. No Ferruginous Hawk nestlings were banded in 2004.

Table 1. Reproductive performance of Ferruginous Hawks in the Kevin P. Raptor Study Area (KRRSA), 2004.

Successful	Young Produced
------------	----------------



Nesting Area	ul Pairs	Total	Per Pair
Primary Study Area	7	$\geq 22$	$\geq 3.14$
Rattlesnake Coulee	2	$\geq 5$	$\geq 2.5$
Flats	1	3	3.0
KRRSA	10	$\geq 30$	$\geq 3.0$

<sup>1</sup>Approximate production-brood sizes were minimum.



Needing Area	of Pair	Total	Per Pair
Primary Study	7	522	52.14
Area			
Rotational Coupler	2	25	25.2
Plate	1	3	3.0
KRISA	10	230	23.0

Approximate production-prod sizes were minimum.



# FERRUGINOUS HAWK

● Productive (minimum # young)

○ Occupied  
No Evidence of Activity

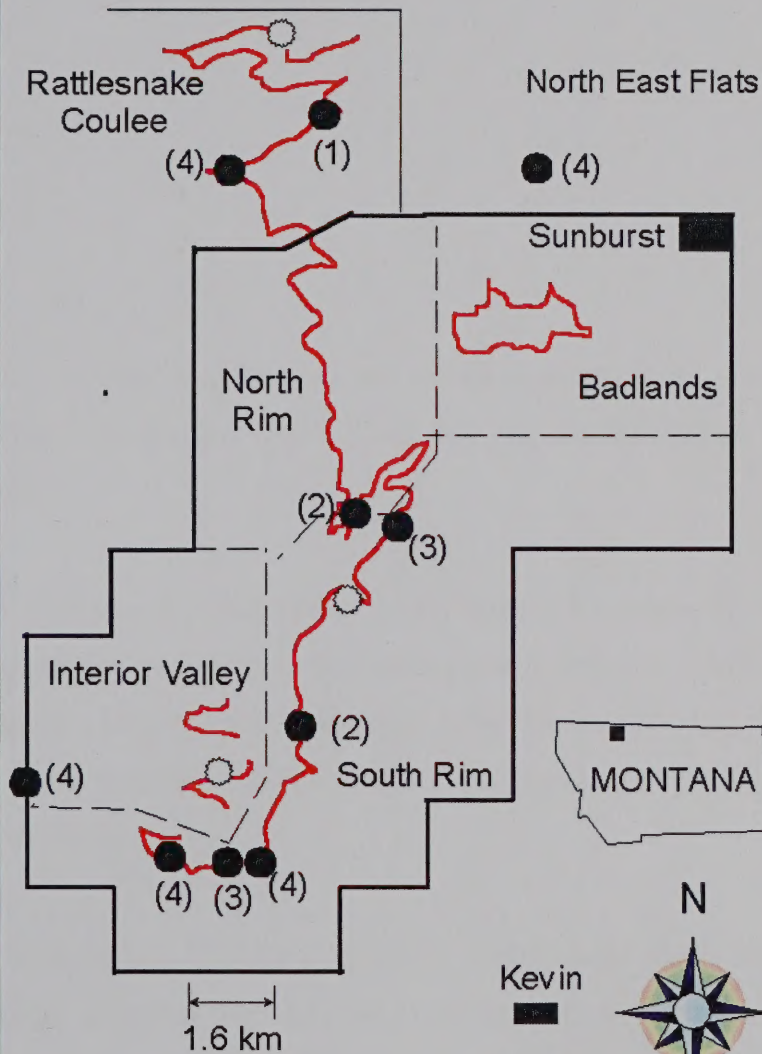






Figure 2. Breeding success and minimum productivity (see text) of Ferruginous Hawks. Keweenaw Peninsula Study Area, 2004.

*Long-term Success and Productivity.* A mean of 7.8 nests ( $n = 15$ ,  $SE = 0.84$ ) have been successful per year in the P2A since surveys began in 1988. However, number of successful nests in the P2A declined from 1988 to 2004 ( $r = -0.595$ ,  $P = 0.019$ ) (Fig. 3). If the trend continues, regression suggests no Ferruginous Hawk pairs will be successful after 2012.

Mean productivity was 21.1 ( $n = 15$ ,  $SE = 7.80$ ) hawks of advanced age per year and although number of young produced per year appeared to decline also, slope of regression line of was not statistically different from zero ( $r = -0.42$ ,  $P = 0.167$ ), presumably due to the extreme variability in production year to year (Fig. 3).





Figure 2. Breeding success and minimum productivity (see text) of Ferruginous Hawks, Kevin Rim Raptor Study Area, 2004.

*Long-term Success and Productivity*-. A mean of 7.8 nests ( $n = 15$ ,  $SE = 0.84$ ) have been successful per year in the PSA since surveys began in 1988. However, number of successful nests in the PSA declined from 1988 to 2004 ( $r = -0.595$ ,  $P = 0.019$ )(Fig. 3). If the trend continues, regression suggests no Ferruginous Hawk pairs will be successful after 2012.

Mean productivity was 21.1 ( $n = 15$ ,  $SE = 2.80$ ) hawks of advanced age per year and although number of young produced per year appeared to decline also, slope of regression line of was not statistically different from zero ( $r = -0.422$ ,  $P = 0.117$ ), presumably due to the extreme variability in production year to year (Fig. 3).

Table 2. Reproductive performance of Prairie Falcons in the Kevin Rim Raptor Study Area (KRRSA), 2004.

	Successful	Young Produced
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Figure 2. Breeding success and minimum productivity (see text) of Ferruginous Hawks, Kevin Pitt Raptor Study Area, 2004.

Long-term Success and Productivity. A mean of 1.8 nests ( $n = 12$ ,  $SE = 0.84$ ) have been successful per year in the PSA since surveys began in 1988. However, number of successful nests in the PSA declined from 1988 to 2004 ( $r = -0.592$ ,  $P = 0.019$ ) (Fig. 3). If the trend continues, regression suggests no Ferruginous Hawk pairs will be successful after 2012.

Mean productivity was 21.1 ( $n = 12$ ,  $SE = 2.80$ ) hawks of advanced age per year and although number of young produced per year appeared to decline also, slope of regression line of was not statistically different from zero ( $r = -0.422$ ,  $P = 0.117$ ), presumably due to the extreme variability in production year to year (Fig. 3).



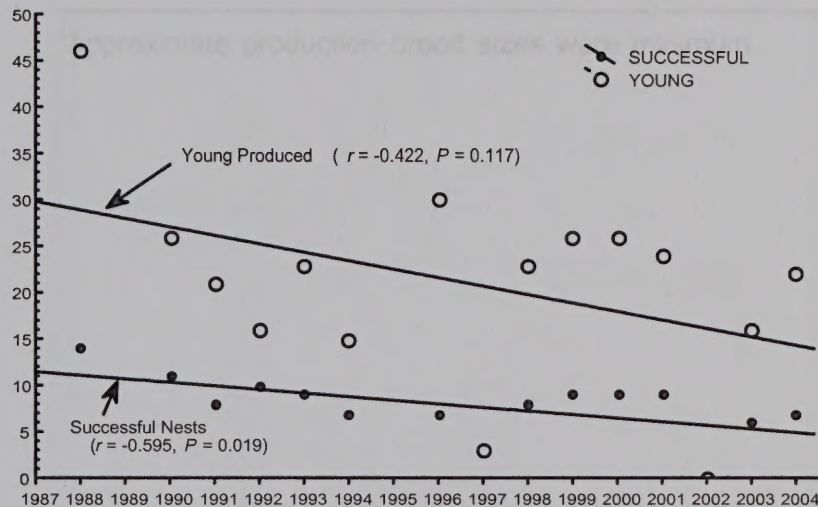


Figure 3.

e 3. Regression of number of successfully breeding ( $\geq 1$  young of advanced age) Ferruginous Hawk pairs and productivity (total young produced) in the Primary Study Area portion of the Kevin Rim Raptor Study Area, 1988 - 2004.

**Prairie Falcons.**— Ten Prairie Falcon pairs were successful in 2004, producing a minimum of 20 young (Table 2, Fig. 4). Recorded productivity of falcons was undoubtedly lower than actual. Several newly fledged falcons were observed on ledges  $>50$  m from the suspected eyrie and cliff racing along hillsides and escarpments. Also, additional eyasses may have been hidden within eyries.

Table 2. Reproductive performance of Prairie Falcons in the Kevin Rim Raptor Study Area (KRRSA), 2004.

Successf	Young Produced <sup>1</sup>
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Successful Young Produced

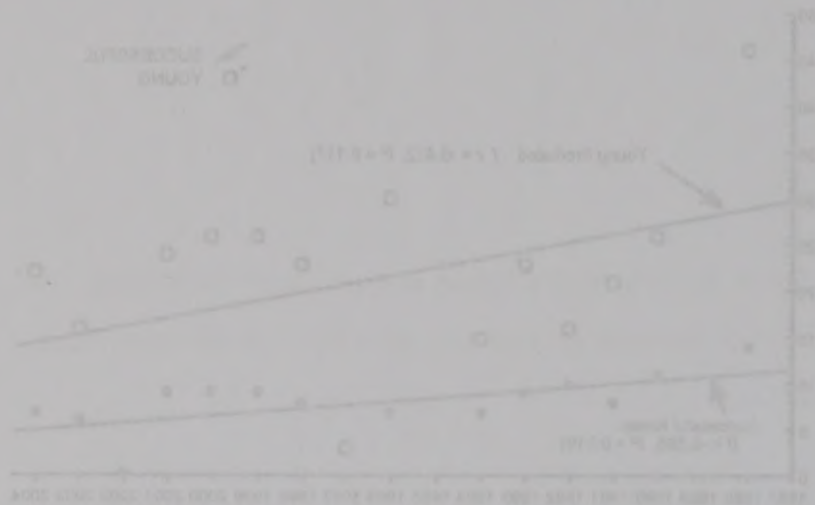
Table 5. Reproductive performance of Prairie Falcons in the Kevin Rim Radar Study Area (KRRSA), 2004.


may have been hidden within eyer. suggested eye and cliff among along hillides and escarpments. Also, additional eyeses than actual. Several newly fledged falcons were observed on ledges > 20 m from the of 20 young (Table 5, Fig. 4). Recorded productivity of falcons was undoubtedly lower Prairie Falcons - Ten Prairie Falcon pairs were successful in 2004, producing a minimum

Study Area, 1982 - 2004.

produced) in the Primary Study Area portion of the Kevin Rim Radar advanced age) Ferruginous Hawk pairs and productivity (total young of 21 young of

Figure



Nesting Area	ul Pairs	Total	Per Pair
Primary Study Area	6	$\geq 9$	$\geq 1.5$
Rattlesnake Coulee	4	$\geq 11$	$\geq 2.75$
KRRSA  Disputed, No (young)	10	$\geq 20$	$\geq 2.0$

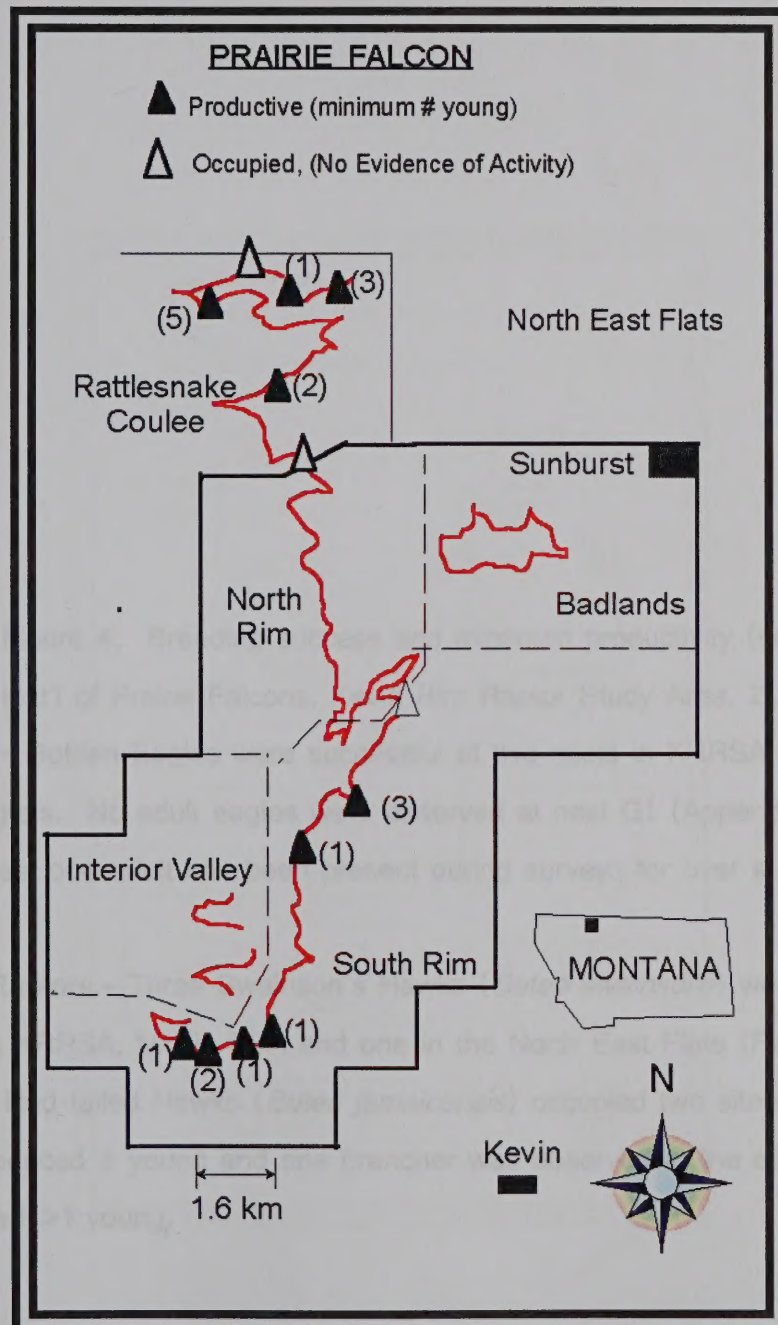
<sup>1</sup>Approximate production-brood sizes were minimum.





Nesting Area		ul	
		Pairs	Total
Primary Study	5	28	140
Area			
Intermediate Control	4	211	844
IBRSA	10	250	2500

Approximate production-breed sizes were minimum.







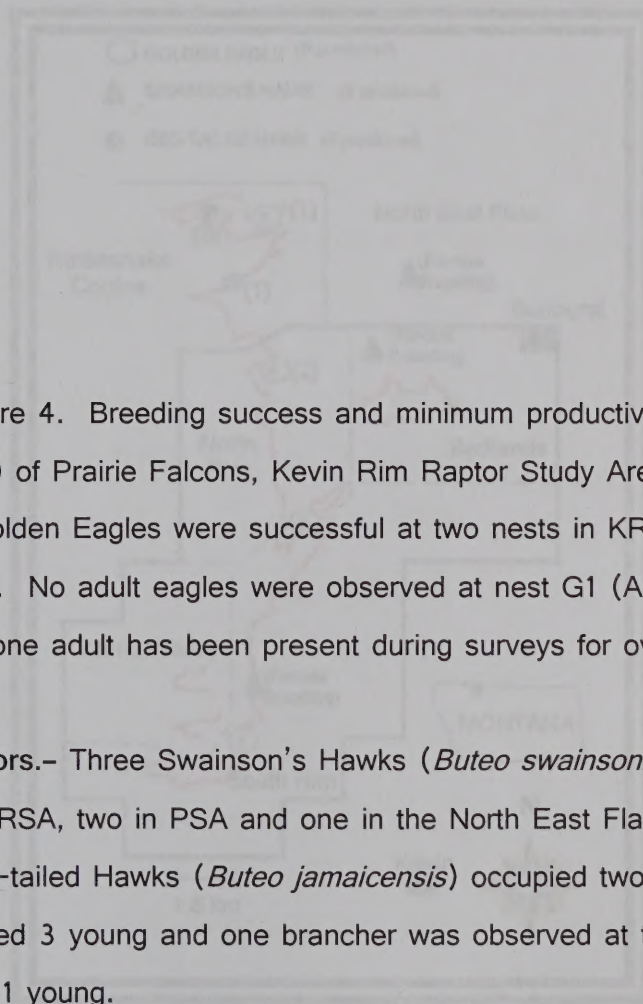


Figure 4. Breeding success and minimum productivity (see text) of Prairie Falcons, Kevin Rim Raptor Study Area, 2004.

**Golden Eagles.**--Golden Eagles were successful at two nests in KRRSA (Fig. 5), producing 3 eaglets. No adult eagles were observed at nest G1 (Appendix Table 2), a site where at least one adult has been present during surveys for over a decade.

**Other Diurnal Raptors.**-- Three Swainson's Hawks (*Buteo swainsonii*) were incubating at different sites in KRRSA, two in PSA and one in the North East Flats (Fig. 5). Production was unknown. Red-tailed Hawks (*Buteo jamaicensis*) occupied two sites in Rattlesnake Coulee, one produced 3 young and one brancher was observed at the other; most likely the pair produced >1 young.

the pair produced >1 young. Couleer, one produced 3 young and one prairie falcon was observed at the other, most likely was unknown. Red-tailed Hawks (*Buteo lineatus*) occupied two sites in Rattanak. Production different sites in KRRA, two in PSA and one in the North East Flats (Fig. 2). Production of other diurnal raptors - Three Swainson's Hawks (*Buteo swainsoni*) were incubating at

one where at least one adult has been present during surveys for over a decade. producing 3 eagles. No adult eagles were observed at nest G1 (Appendix Table 2). a Golden Eagle-Golden Eagle were successful at two nests in KRRA (Fig. 2). (see text) of Prairie Falcons, Kevin Rim Raptor Study Area, 2004. Figure 4. Breeding success and minimum productivity (see

Figure 3. Location and minimum productivity (see Table 3) of other raptor pairs, Kevin Rim Raptor Study Area, 2004. Golden Eagle pairs 1 and 4 (# within icon) were successful but pairs 1 and 2 were absent (see Appendix Table 3). Young

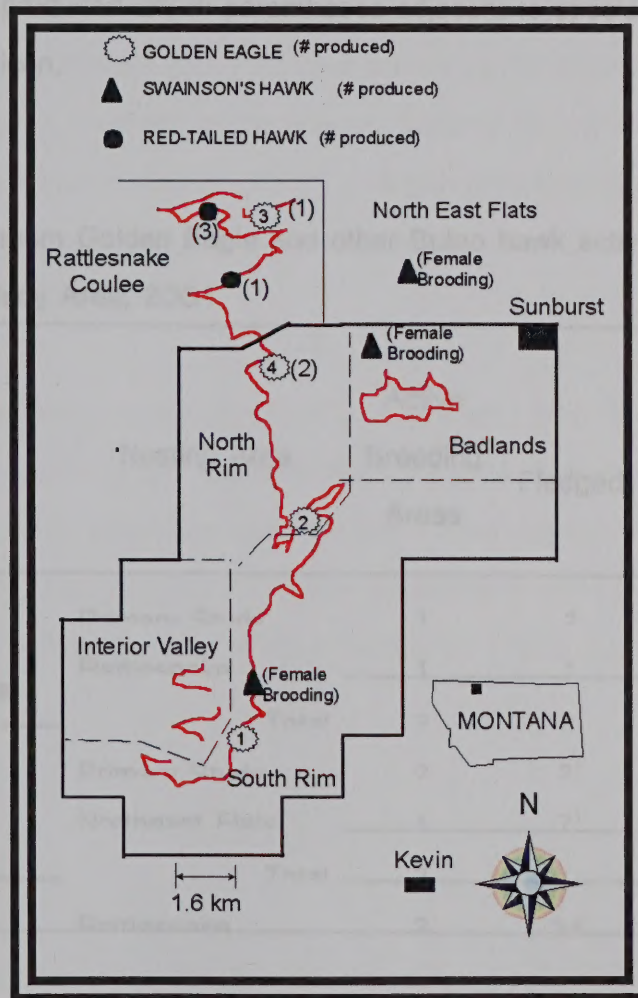






Figure 5. Location and minimum productivity (see text) of other raptor pairs, Kevin Rim Raptor Study Area, 2004. Golden Eagle pairs 3 and 4 (# within icon) were successful but pairs 1 and 2 were absent (see Appendix Table 3). Young produced are in parentheses adjacent to species icon.

Table 3. Minimum Golden Eagle and other Buteo hawk activity in the Kevin Rim Raptor Study Area, 2004.

Species	Nesting Area	Active Breeding Areas	Fledged	Young per Active Breeding Area
Golden Eagle	Primary Study	1	2	2.0
	Rattlesnake	1	1	1.0
	Total	2	3	1.5
Swainsons Hawk	Primary Study	2	2 <sup>1</sup>	
	Northeast Flats	1	2 <sup>1</sup>	
	Total	3		
Red-tailed	Rattlesnake	2	>4	>2.0

<sup>1</sup>Incubating.

## Prey Availability

Figure 2. Location and minimum productivity (see text) of other raptor pairs, Kevin Rim Raptor Study Area, 2004. Golden Eagle pairs 3 and 4 (4 within 1000) were successful but pairs 1 and 2 were absent (see Appendix Table 3). Young produced are in parentheses adjacent to species logo.

Table 3. Minimum Golden Eagle and other Buteo hawk activity in the Kevin Rim Raptor Study Area, 2004.

Species	Nesting Area	Active Breeding Areas	Feeding	per Active Breeding Area
Golden Eagle	Bottomland (2nd)	1	2	2.0
	Bottomland	1	1	1.0
	Total	2	3	3.0
Baldpate	Bottomland (2nd)	2	2	
	Bottomland (1st)	1	2	
	Total	3	4	
Baldpate	Bottomland (2nd)	2	2	
	Bottomland (1st)	1	2	
	Total	3	4	
Total				
3.0				



No lagomorph headlight surveys or ground squirrel burrow counts were conducted in 2004.

Habitat Type	Search Type	Total Time	Species encountered
Man made pond	Listening	156 min.	Plains spadefoot

## Herptiles

There is a paucity of data on reptile and amphibian species in Toole County. Herpetological searches in the Kevin Rim area have thus far identified only three species of the 11 that have been recorded in the county. Most of the other species recorded have been from Tiber Reservoir (Rauscher 2000). Search efforts during this study were unsuccessful in located additional distribution of species which seem likely for that area, based on habitat characteristics.

No specimens were encountered during the general area reconnaissance nor during driving searches. However, those searches were valuable in determining access routes, distribution of habitat, and prioritizing search areas. Listening and walking searches were more productive. Only two species, the Plains spadefoot toad (*Spea bombifrons*) and the Western rattlesnake (*Crotalus viridis*) were encountered (Table 4).

No topographic headlight surveys or ground squirrel burrow counts were conducted

in 2004

Harpies

There is a paucity of data on reptile and amphibian species in Toole County. Herpetological searches in the Keweenaw area have thus far identified only three species of the 11 that have been recorded in the county. Most of the other species recorded have been from Tiber Reservoir (Rauscher 2000). Search efforts during this study were unsuccessful in locating additional distribution of species which seem likely for this area, based on habitat characteristics.

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Table 4. Non-vehicular reptile and amphibian search types, times, and results, Kevin Rim Raptor Study Area, 2004.

Habitat Type	Search Type	Total Time	Species encountered
Man made pond	Listening	156 min.	Plains spadefoot toad
Man made pond	Walking	68 min.	Plains spadefoot toad
Grassland bench	Walking	120 min.	None
Cliff base	Walking	83 min.	Western rattlesnake
Shrub/grass draw	Walking	77 min.	None
Temporary stream	Walking	28 min.	None

Spadefoot toads are explosive breeders, in that they emerge from underground burrows only after a rain, then quickly breed and go back into burrows as the habitat dries out. At the man made pond where a listening survey was conducted, an estimated 10-100 individuals were calling the night of 1 July. On 2 July, another pond was visited during a walking search that contained an estimated 1000-3000 large tadpoles of this species. Identification of tadpoles is based on Maxell et al. (2003).

Rattlesnakes are rumored to be common in the area, but proved to be somewhat elusive. Only two were found, both during walking searches along the cliff base along the South Rim, an area that is strewn with rockfall providing excellent cover for this species.



Table 4. Non-ventricular reptile and amphibian search types, times, and results, Keweenaw Point Raptor Study Area, 2004.

Habitat Type	Search Type	Total Time	Species encountered
Man made pond	Listening	15 min.	Plains spadefoot
Man made pond	Waiting	6 min.	Plains spadefoot
Grassland bench	Waiting	120 min.	None
Cut base	Waiting	83 min.	Western rattlesnake
Shrub/grass	Waiting	77 min.	None
Grass	Waiting	18 min.	None

Spadefoot toads are explosive breeders, in that they emerge from underground burrows only after a rain, then quickly breed and go back into burrows as the habitat dries out. At the man made pond where a listening survey was conducted, an estimated 10-100 individuals were calling the night of 1 July. On 2 July, another pond was visited during a waiting search that contained an estimated 1000-3000 large toads of this species. Identification of toads is based on Maxwell et al. (2003).

Rattlesnakes are rumored to be common in the area, but proved to be somewhat elusive. Only two were found, both during waiting searches along the cut base along the South Point, an area that is strewn with rockfall providing excellent cover for this species.

In addition, locations of two specimens from the valley area to the south and east of the the Kevin Rim formation were recirded. Location of all specimens is provided in Table 5.

The Boreal chorus frog (*Pseudacris maculata*) was not encountered, but is certainly present, as it has been recorded in this area previously (Maxell et al. 2003). Listening surveys for this species need to be conducted in May, but this effort was not initiated until the end of June when temporary streams were nearly dried up. An earlier effort would have revealed the presence of this species, probably in abundance.

Table 5. Reptile and amphibian encounters, Kevin Rim Raptor Study Area, 2004.

Date	Species	No.	Size/Age	UTM
	*			
7-1-04	Crvi	1	Lg. Ad.	12U 0424164 5404368
7-1-04	Spbo	10-100	Ad.	12U 0422230 5402087
7-1-04	Crvi	1	Ad. (MR)	12U 0423499 5402980
7-1-04	Crvi	1	Juv. (MR)	12U 0421051 5402840
7-2-04	Spbo	1000- 3000	Larvae	12U 0425778 5404772
8-17-04	Crvi	1	Sm. Ad.	12U 0424010 5403799

\*Crvi = Western rattlesnake, Spbo = Plains spadefoot toad.

The ghost chorus frog (*Pseudacris maculosa*) was not encountered, but is certainly present, as it has been recorded in this area previously (Maxell et al. 2003). Listening surveys for this species need to be conducted in May, but this effort was not initiated until the end of June when temporary streams were nearly dried up. An earlier effort would have revealed the presence of this species, probably in abundance.

In addition, locations of two specimens from the valley area to the south and east of the Kevin Rim formation were recorded. Location of all specimens is provided in Table 2.

Table 2. Reptile and amphibian encounters, Kevin Rim Riparian Study Area.

Date	Species	No.	Size/Age	UTM
7-1-04	Cvt	1	Lg. Ad.	12U 0424164 2403368
7-1-04	Spbd	10-100	Ad.	12U 0422330 2403087
7-1-04	Cvt	1	Ad. (MR)	12U 0423429 2403980
7-1-04	Cvt	1	Juv. (MR)	12U 0421021 2403840
7-5-04	Spbd	1000-3000	Larvae	12U 0425278 2404175
8-15-04	Cvt	1	Sm. Ad.	12U 0424010 2403799

\*Cvt = Western tailed coon, Spbd = Plains spadefoot toad.



## DISCUSSION

Ferruginous Hawk success in PSA increased slightly over 2003 (Harmata and Jaffee 2003) but was still well below the 16 year mean. Productivity comparisons are more tenuous because of extended observation ranges employed since 1998. At extended ranges, the probability of missing nestlings increases. Unlike 2003, Ferruginous Hawk success and productivity was absent in the flats in 2004. Heavy rains in mid June again occurred at a sensitive time for raptor nestlings. Young Ferruginous Hawks would have been between 20 and 25 days old and less than 50% feathered in mid June (Moritsch 1985). Plumage composition at this time protects against most weather but not moisture and heavy rains may have affected survival of Ferruginous Hawk nestlings. However, whether nestling mortality or lack of egg laying by adult hawks affected success is not known.

Prairie Falcon success and productivity declined slightly in 2004. Eyries may not be immune to flooding from runoff or direct rain, depending on winds and exposure. However, nesting phenology was earlier in 2004 than most previous years and nearly all young falcons detected had fledged. Detecting fledged falcons is difficult without extended monitoring time at each eyrie and minimal observation time most likely affected recorded productivity.

Golden eagles continue to persist at low levels. The pair on the South Rim was not seen despite 3 days of observations in 2004. They have been observed at least once each year of study and their absence is troubling. Site G4 is about mid way between G2 and G3 and there has never been a Golden Eagle nest on that section of North Rim (Fig. 5) since surveys began 1988. G4 may represent a new pair pioneering a

## DISCUSSION

Ferruginous Hawk success in PSA increased slightly over 2003 (Hamata and Jaffer 2003) but was still well below the 15 year mean. Productivity comparisons are more tenuous because of extended observation ranges employed since 1998. At extended ranges, the probability of missing nestlings increases. Unlike 2003, Ferruginous Hawk success and productivity was absent in the field in 2004. Heavy rains in mid June again occurred at a sensitive time for raptor nestlings. Young Ferruginous Hawks would have been between 50 and 55 days old and less than 50% feathered in mid June (Molisch 1982). Plumage completion at this time protects against most weather but not moisture and heavy rains may have affected survival of Ferruginous Hawk nestlings. However, whether nestling mortality or lack of egg laying by adult hawks affected success is not known.

Prong Falcon success and productivity declined slightly in 2004. Eyles may not be immune to flooding from runoff or direct rain, depending on winds and exposure. However, nesting phenology was earlier in 2004 than most previous years and nearly all young falcons detected had fledged. Detecting fledged falcons is difficult without extended monitoring time at each eyrie and minimal observation time most likely affected recorded productivity.

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## MANAGEMENT RECOMMENDATIONS

new breeding area, turnover of one of the breeding pair from G2, or the pair from G2 moving to a new site.

As a result of fair precipitation in 2002, 2003, and 2004 ground vegetation in KRRSA was more lush over a more extensive area than has occurred in a decade. Verdant vegetation may have further reduced hawk and falcon productivity due to difficulty of detection and capture of principal prey (Richardson's ground squirrels and terrestrial birds).

There was again a noticeable absence of raptors along the North Rim and Badlands (Figs. 2 & 3). Where as many as seven pairs of hawks nested in the past, none were present in 2004. Not even single adults were seen. Continued absence of successful hawks and falcons is troubling and we are still at loss for an explanation. Depressing factors are either very subtle or exerted at a time observers are absent. More than a decade of declining productivity may be a component of a normal, long-term cyclic pattern or indicative of populations under stress.

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## MANAGEMENT RECOMMENDATIONS

### *Raptors*

Management recommendations presented in Harmata and Gabler (2000) are still appropriate, especially the need for an integrated Kevin Rim Raptor Management Plan, directed specifically at reducing human impacts on nesting raptors. We advocate active discouragement of any attempt to promote Kevin Rim public lands as a destination for any type of spring-summer recreational activity (*i.e.*, birding, off-road vehicle, hiking).

### *Herptiles*

Survey timing in 2004 was appropriate for the reptile species anticipated to occur in the Kevin Rim area. However, the Boreal chorus frog breeds earlier in the season, and listening searches should be conducted in mid-May. A more comprehensive view of the reptile and amphibian community could be attained by conducting surveys monthly, from May through August.

Oil production in the area may have impacted the reptile and amphibian community, possibly reducing density of some species, and perhaps compromising species diversity. The magnitude of this impact is presently unknown, and would require a detailed research plan incorporating an appropriate control area.

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## MANAGEMENT RECOMMENDATIONS

Reptiles

Management recommendations presented in Hamata and Gable (2000) are still appropriate, especially the need for an integrated Kevin Rim Reptile Management Plan, directed specifically at reducing human impacts on nesting reptiles. We advocate active discouragement of any attempt to promote Kevin Rim public lands as a destination for any type of spring-summer recreational activity (i.e., hiking, off-road vehicle riding).

Herpetiles

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# APPENDIX TABLE 3

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# APPENDIX TABLES

Appendix Table 1. Location, minimum productivity (nestlings >4 wks old)<sup>1</sup>, and plumage descriptions (N = normal, M = melanistic) of nesting Ferruginous Hawks, Kevin Rim Raptor Study Area, 2004.

Nest #	Nesting District	UTM <sup>2</sup>		Land Ownership	Number/Plumage		Name
		Eastin g	Northin g		Adult	Nestlings	
F0	Int. V	41995 0	540500 0	Private	2N	4N	W Boundary
F1	Int. V	42090 0	540610 0	MT State			W Pinnacle
F2	Int. V	42239 0	540587 5	MT State			Int. Valley N
F3	Int. V	42206 0	540547 5	MT State			Int. Valley M
F3A	Int. V	42236 0	540470 0	Private	2N		Int. Valley S
F4	S. Rim	42120 0	540364 0	Private	2N	4N	W Rim
F5	S. Rim	42173 0	540329 0	Private			Falcon Squeezed
F5B	S. Rim	42223 0	540321 0	BLM	2N	3N	Prairie Point E
F5A	S. Rim	42337 5	540346 0	BLM	2N	4N	Look Over
F6	S. Rim	42455 0	540504 0	BLM			Eagle Blind
F6A*	S. Rim	42495 0	540575 0	BLM	_M	2N	TP Rings W
F7	S. Rim	42634	540790	BLM	2N		TP Rings N



# APPENDIX TABLES

Appendix Table 1. Location, minimum productivity (nestlings > 4 wks old), and average description (N = normal, M = melanistic) of nesting *Fringillus* Hawaii, Kauai, Piihi Study Area, 2004.

Nest #	Nesting District	UTM Easting	UTM Northing	Land Ownership	Number of Progeny		Notes
					Adult	Nestlings	
F0	Int. V	41992	240200	Private	2H	4H	W Boundary
		0	0				
F1	Int. V	42080	240210	MT State			W Private
		0	0				
F2	Int. V	42232	240227	MT State			Int. Valley N
		0	2				
F3	Int. V	42288	240247	MT State			Int. Valley N
		0	2				
F3A	Int. V	42228	240225	Private	2H		Int. Valley S
		0	0				
F4	S. Rim	42120	240244	Private	2H	4H	W Rim
		0	0				
F5	S. Rim	42123	240223	Private			Falcon
		0	0				Guanoed
F5B	S. Rim	42223	240221	BLM	2H	2H	Private Point E
		0	0				
F5A	S. Rim	42122	240246	BLM	2H	4H	Look Over
		2	0				
F6	S. Rim	42422	240208	BLM			Eagle Bird
		0	0				
F6A	S. Rim	42422	240228	BLM	M	2H	TP Ridge W
		0	0				
F7	S. Rim	42524	240220	BLM	2H		TP Ridge N

		0	0				
F8	S. Rim	42682	540898	MT State	_M	3N	Dark Dad
		5	0				
F9	N. Rim	42742	541020	BLM			Fossil Find
		0	0				
F9A	N. Rim	42666	540900	MT State	2N	2N	Rock Art
		5	0				
F10	N. Rim	42513	541195	Private			Big Valley
		0	0				
F11	N. Rim	42475	541342	BLM			Rotella
		0	5				
F12	Rattl. C.	42491	541618	Private			Davis Place
		0	0				
F13	Rattl. C.	42522	541677	Private		1N	Nobody Home
		5	5				
F14	Rattl. C.	42606	541701	Private			Ground
		0	0				
F15	Rattl. C.	42544	541757	Private			Cartridge
		0	5				
F16	Rattl. C.	42410	541827	Private	2N		Bull Pasture
		0	5				
F16A	Rattl. C	42272	541780	Private			Last Lake
		5	0				
F17	Badland s	gone		Private			Broken Cliff
F18	Badland s	gone		BLM			Mud Bank
Platform	Badland s	43039	541001	MT State			W Platform
		5	0				
Platform	Badland s	43043	541003	Private			E Platform
		0	0				
F19*	N. Rim	42545	541430	BLM			Fox Kit

42482	240885	MT 2000	M	3M	Dark Lab	0	0
42483	240886	BLM			Fossil Find	0	0
42484	240887	MT 2000	YN	2M	Rock Art	0	0
42485	240888	Private			Big Valley	0	0
42486	240889	BLM			Rolling	0	0
42487	240890	Private			Dark Forest	0	0
42488	240891	Private	IM		Robbery House	0	0
42489	240892	Private			Ground	0	0
42490	240893	Private			Cumings	0	0
42491	240894	Private	2M		Ball Patches	0	0
42492	240895	Private			Leaf Lake	0	0
42493	240896	Private			Broken Crib	0	0
42494	240897	BLM			Iron Gun	0	0
42495	240898	MT 2000			W. Bluffs	0	0
42496	240899	Private			E. Bluffs	0	0
42497	240900	BLM			For Kt	0	0



		0	0				
F20*	Ratt. C.	42370	541542	Private	2N	4N	Spring Gulch
		0	5				
F21	N. Flats	43002	541640	Private	2N	3N	Stock Pond
		5	0				
F22	N. Flats	gone		Private			Simmes Pond
F23	SE Flats	43690	539925	Private			Kevin Exit
		0	0				
F24	SE Flats	43582	539547	Private			W I-15 E
		7	4				
F25	SE Flats	43410	539541	Private			W I-15 W
		8	5				
F26	SE Flats	44055	540094	Private			Oil Tank
		1	2				

<sup>1</sup>Observation distance maximized to prevent disturbance; some nestlings may have been missed.

<sup>2</sup>UTMs obtained from map plots, *not* GPS readings; so all you nouveau raptor elitists take note and don't criticize.

\*Indicates nest new in 2004.

750	West C.	4170	241243	Private	2N	4N	Spring Gulch
		0	2				
751	N. 1st	4205	241640	Private	2N	2N	Stock Pond
		2	0				
752	N. 1st	good		Private			Stinner Pond
753	SE 1/4	43260	23822	Private			Kahn Ex.
		0	0				
754	SE 1/4	43262	238247	Private			W-12 E
		1	4				
755	SE 1/4	43410	238247	Private			W-12 W
		2	2				
756	SE 1/4	44022	240094	Private			Oil Tank
		1	2				

Observation distance maximumed to prevent disturbance; some readings may have been missed.  
 \*Litter obtained from trap grids, not GPS readings; so all you know is that litter was there  
 and don't know  
 \*negative field row in 2004

Appendix Table 2. Location and productivity (nestlings >4 wks old) for Prairie Falcon breeding areas located within the Kevin Rim Raptor Study Area, 2004.

Breeding Area #	Nesting District	UTM		Land Ownership	Productio n 2004	Name
		Easting	Northing			
P1	S. Rim	424200	540350 0	Private	≥1 <sup>a</sup>	Bookcase
P2	S. Rim	422350	540340 0	Private	≥2 <sup>a</sup>	
P3	S. Rim	422950	540337 5	BLM	≥1 <sup>a</sup>	
P4	S. Rim	423510	540354 0	Private	≥1 <sup>a</sup>	Radio Shack
P4A	S. Rim	424150	540480 0	BLM		
P5	S. Rim	425525	540822 5	BLM		TP Rings
P5A	S. Rim	425700	5407150	BLM	≥1 <sup>a</sup>	Hoodoos
P5C	S. Rim	426650	540775 0	BLM	≥3 <sup>a</sup>	Upper TP Bowl
P6	S. Rim	427475	540895 0	MT State	?	S. Finger
P7	S. Rim	427475	540977 5	MT State		Zelonic's Ticks
P7A	S. Rim	427420	5410250	BLM		Fossil Point
P8	N. Rim	424690	5412780	BLM		
P9	Rattl. C.	425400	5413800	BLM		
P9A	Rattl. C.	424360	5415660	Private	≥2 <sup>a</sup>	Red-tail



Appendix Table 2. Location and productivity (nestlings > 4 wks old) for  
 Prairie Falcon breeding areas located within the Kevin Rim Riparian Study  
 Area, 2004.

Breeding Area #	Breeding Nesting Contd.	UTM		Land Ownership	Productivity N-2004	Name
		Eastng	Northng			
P1	S. Rim	454500	540350	Private	27	Bookcase
			0			
P2	S. Rim	455900	540340	Private	25*	
			0			
P3	S. Rim	452800	540371	BLM	21*	
			2			
P4	S. Rim	453200	540354	Private	27*	Radio Shack
			0			
P5A	S. Rim	454100	540460	BLM		
			0			
P5	S. Rim	452250	540422	BLM		7th Range
			2			
P5A	S. Rim	453700	540720	BLM	27*	Hooded
P5C	S. Rim	456800	540720	BLM	25*	Upper 7th Bend
			0			
P6	S. Rim	457475	540892	WT State	?	S. Finger
			0			
P7	S. Rim	457475	540877	WT State		Zelinka's Ridge
			2			
P7A	S. Rim	457450	541020	BLM		Forest Point
P8	H. Rim	454600	541280	BLM		
P9	Trail C	452400	541500	BLM		
P9A	Trail C	454300	541280	Private	25*	Red-tail

P9B	Rattl. C.	425325	5414300	BLM	<sup>b</sup>	
P10	Rattl. C.	425210	5416280	Private		
P10A	Rattl. C.	425110	5416880	Private		
P11	Rattl. C.	423590	5418025	Private		
P12	Rattl. C.	424690	5417450	Private	≥3	Eagle Food
P13	Rattl. C.	422750	5417250	Private	≥5 <sup>a</sup>	Last Lake S.
P13A	Rattl. C.	423550	5417580	Private		Interlake S.

<sup>a</sup>Fledged.

<sup>b</sup>One adult present.

P13A	West C.	45330	2417500	Private	Infantry B.
P13	West C.	45250	2417500	Private	Infantry B.
P12	West C.	45480	2417450	Private	Infantry B.
P11	West C.	45390	2418055	Private	Infantry B.
P10A	West C.	45210	2416880	Private	Infantry B.
P10	West C.	45210	2416280	Private	Infantry B.
P9B	West C.	45228	2416300	Private	Infantry B.

Private  
Private



Appendix Table 3. Location and productivity (nestlings >4 wks old) for Golden Eagle (prefix G), Swainson's Hawk (prefix S), and Red-tailed Hawk (prefix R) breeding areas located within the Kevin Rim Raptor Study Area, 2004.

Breeding Area #	Nesting District	UTM		Land Ownership	Production n 2004	Name
		Easting	Northing			
G1	S. Rim	424175	540420	BLM	<sup>a</sup>	S. Rim
			0			
G2	N. Rim	426480	540967	MT State		Petroglyph
			5			
G3	Rattl. C.	424625	5417325	Private	1	Simmes
G4	N. Rim	425700	5413775	BLM	2 <sup>b</sup>	Red Fox Kit
S1	S. Rim	424850	540555	BLM	Incubating	TP Ring Spring
			0			
S2	NE Flats	429350	5416500	Private	Incubating	Sunburst Road
S3	NE Flats	429500	5413675	Private	Incubating	Lone Tree
R1	Rattlesnake Coulee	424700	5415700	Private	≥1 <sup>c</sup>	Homestead
R2	Rattlesnake Coulee	424700	5415700	Private	≥3	Last Lake S.

<sup>a</sup>No adults present.

<sup>b</sup>New nest site.

<sup>c</sup>Fledged.

Appendix Table 2. Location and productivity (nestlings > 4 weeks old) for Golden Eagle (prefix G), Swainson's Hawk (prefix S), and Red-tailed Hawk (prefix R) productivity areas located within the Kevin Rim Reptor Study Area, 2004.

Productivity Area	Name	Land Ownership	UTM		Productivity n 2004
			Easting	Northing	
G1	S. Rim	BLM	454175	540420	1
G2	N. Rim	MT State	454480	540357	1
G3	Walt C.	Private	454655	541732	1
G4	N. Rim	BLM	455700	541375	2
G5	S. Rim	BLM	454850	540555	1
G6	NE Hill	Private	453350	541650	1
G7	NE Hill	Private	453700	541375	1
R1	Holloway	Private	454700	541570	2
R2	Holloway	Private	454700	541570	2

We define productivity as the number of nestlings > 4 weeks old.